

Synthetic Aperture Radar Approaches for Small Maritime Target Detection and Discrimination

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Description:

Traditionally SAR has been used to provide imagery of fixed structures on land. Objects moving in the scene were unfocused and generally not of value. For large vessels at sea in relatively calm conditions, some advanced focusing algorithms are able to provide high quality imagery but are not useful for small vessels with very dynamic movements. For maritime environments, the community has relied on low altitude (<1000') non-coherent techniques that leverage lower clutter returns present in at these low grazing angles. Coherent techniques based on SAR processing are far less sensitive to grazing angle, allowing the platform to operate at higher altitudes and steeper grazing angles (perhaps 10's of degrees). In addition, they offer improved performance due to a richer set of potential discriminants. Increased standoff ranges are attained using the coherent techniques as well as allowing the use of lower cost, lower peak powered radars. The suggested approach differs from traditional SAR in that the objective is not to "focus" the target but rather to leverage the nature of the target signature and the coherence of the background to improve detection, tracking and discrimination. PHASE I: Design and demonstrate the feasibility of a SAR based small maritime target approach for detection and tracking using available field data or synthetic data. PHASE II: Mature the detection and tracking approach to be suitable for integration into an existing Navy airborne maritime surveillance radar system. Develop a set of discriminates using field data for a limited set of target types identified by the Navy. PHASE III: Refine and improve the implementation for

integration on Navy maritime surveillance radar systems suitable for platforms such as the MQ-8C, MQ-4C, MH-60R and P-8A.